

Resolving the Environmental Legacy

Environment Strategic Goal: To protect the environment by providing a responsible resolution to the environmental legacy of the Cold War and by providing for the permanent disposal of the Nation's high-level radioactive waste.



Brookhaven National Laboratory: Inside the newly constructed industrial park east groundwater treatment system, tucked away at an off-site industrial park, Stefano Ciafani, an environmental engineer and consultant to the Italian Parliamentary Commission on waste recycling, learns how granulated carbon is used to absorb contaminants from groundwater. The new groundwater treatment building, running in test-mode in February 2004, was pumping groundwater at depths of nearly 300 feet below the surface. At full capacity, the system is designed to clean contaminated groundwater at a rate of 160 gallons per minute.

The Department has had an environmental mission since its establishment in 1977. This mission has become more important since the end of the Cold War. Fifty years of nuclear defense work and energy research resulted in large volumes of solid and liquid radioactive waste along with significant areas of contaminated soil and water.

The Department's Environmental Management (EM) program was established in 1989 to clean up the contamination from these operations and dispose of the waste in a manner protective of the environment, the workers, and the public. The program, once focused only on managing risk, is now demonstrating the benefits of accelerating cleanup and closure by realizing the completion of tangible results. Over the last three years, the program has delivered significant risk reduction and cleanup results while ensuring that the cleanup is safe for workers, protective of the environment and respectful to the taxpayer. These outcomes are providing important and valuable benefits to the public, our communities, and for the generations to come.

While certain tank waste cleanup and management activities have been delayed as a result of litigation concerning the Department's Waste Incidental to Reprocessing (WIR) authority, EM has made significant advances in FY 2004 in accelerating other areas of risk reduction and environmental cleanup. These include completing more release site cleanups than were scheduled, and either completing the packaging, or packaging more than had been planned, of plutonium and other high risk nuclear materials, including spent nuclear fuel (SNF) for secure storage until disposition in a geologic repository. In addition, the Department was successful in launching the new Office of Legacy Management, which has as its mission the responsibility to ensure protection of human health and the environment through effective long-term stewardship of land, structures, facilities, and records, as well as the oversight of the Department's post-closure responsibilities for former contractor employees (refer to following discussion on Office of Legacy Management).

Office of Legacy Management

The Department has taken major steps toward fulfilling its commitment to cleanup the environmental portion of its legacy and is now faced with large scale closure of entire sites and the associated impacts on the federal and contractor workforce. In order to ensure proper focus on and management of these emerging responsibilities, the Department established the Office of Legacy Management (LM) in December 2003. Consistent with the Department's Strategic Plan, LM is working to ensure that the cleanup remedies remain protective, that the commitments made regarding pensions and benefits are met, and that the stakeholders (state, local and Tribal governments and the public) remain aware of the Department's activities and are able to contribute to its decision-making process. The following provides a more detailed summary of the Office's functions and responsibilities:

- LM is currently responsible for the long-term care of 67 sites – the majority of which are either former uranium mill tailing sites or sites associated with the Formerly Utilized Sites Remedial Action Program (FUSRAP). By 2015, LM will be managing land, environmental liability, and/or records for 120 sites, as EM completes its cleanup activities and additional sites transfer from private licensees and the U.S. Army Corps of Engineers.
- LM avoids benefit interruption while maintaining and improving the quality of service to post-closure plan participants.
- LM works closely with affected communities, local governments, regulators, and adjacent landowners to identify beneficial reuse of land that is safe for the public and protective of the environment.
- LM has responsibility for the cost effective management of large volumes of records and information associated with the cleanup sites and the oversight of former contractors' benefits.



Savannah River Site: With the completed demolition of the 320-M Alloy Manufacturing Facility (seen at left), Savannah River Site (SRS) workers have met the challenge of safely demolishing six M-Area facilities in less than 18 months. Historically, M-Area was the beginning of the production process at SRS. Here, facilities produced materials for use in SRS reactors. All operations have been shut down since the late 1980s. The remainder of M-Area is scheduled to be razed by the end of 2006.

Security objective. Further, containment of the waste will ensure that it does not pose a significant risk to human health and the environment. In FY 2004, the program focused on the development of a draft license application which is on the critical path to opening the geologic repository.

The following section contains an overview of the results associated with the performance against our most significant goals and annual targets for FY 2004.

Environmental Management - General Goal 6:

Accelerate cleanup of nuclear weapons manufacturing and testing sites, completing cleanup of 108 contaminated sites by 2025.

The Nuclear Waste program also supports a critical outcome for the nation-safe disposal of high-level radioactive waste (HLW) and SNF. Consolidation of this nuclear waste from many locations scattered across the country will accomplish our Homeland

Environment General Goals

Performance Scorecard:

ENVIRONMENT (\$ in Millions)

GENERAL GOAL	FY04 PROGRAM COST	FY03 PROGRAM COST	PROGRAM GOALS	*FY 2004 Budgetary Expenditures Incurred	OVERALL PROGRAM SCORE	PERFORMANCE OF ANNUAL TARGETS			
						MET	NOT MET (≥80%)	NOT MET (<80%)	UNDETERMINED
Environmental Management	\$6,283	\$6,287	Environmental Management	\$7,967		4	1	3	
			Legacy Management	\$57		1	0	0	
Nuclear Waste	\$530	\$421	Nuclear Waste Disposal	\$526		2	0	0	
Total Costs	\$6,813	\$6,708		\$8,550		7	1	3	0

*Includes capital expenditures but excludes such items as depreciation, changes in unfunded liability estimates and certain other non-fund costs, and allocations of Departmental administration activities.

In August 2001, the Secretary of Energy directed a “Top-to-Bottom” review of the environmental cleanup program, which was completed in February 2002. The Review concluded that significant change was required in how the Department attacked risk reduction and cleanup. The environmental cleanup program stood as one of the largest liabilities of the Federal Government. The top priority for the program has been to reform and refocus the nuclear weapons cleanup program to deliver risk reduction safer and faster and to clean up more efficiently and cost effectively. The Department, working collaboratively with the regulator and stakeholder community, is developing strategies to focus cleanup activities on accelerated risk reduction and site closure.

External Factors:

The following external factors could affect our ability to achieve this goal:

- **Regulatory Requirements:** Compliance with environmental laws and regulations, agreements with state and federal regulators, and legal decisions drive the Department’s cleanup approaches. Laws and regulations are subject to change, agreements with states require renegotiation, and legal decisions can alter strategic frameworks.
- **Cleanup Standards:** The end state for cleanup at certain sites is not fully determined. The extent of cleanup greatly affects cost, schedule and scope of work.
- **Technology:** Suitable cleanup technologies do not always currently exist, and the development and deployment of innovative technologies could help reduce risk, lower cost, and accelerate cleanup.
- **Uncertain Work Scope:** Uncertainties are inherent in the environmental cleanup program due to the complexity and nature of the work. There are uncertainties in our knowledge of the types of contaminants, their extent, and concentrations.
- **Commercially Available Options for Waste Disposal:** Accomplishment of accelerated risk reduction and site closure is dependent upon the continued availability of commercial options for mixed low-level waste and low-level waste disposal.



Hanford Site: Workers are removing drums containing suspect transuranic waste from a retrieval trench in the middle of the site. By mid-March 2004, more than 1,600 drums had been retrieved.



Oak Ridge National Laboratory: Hydrologic isolation activities at the Solid Waste Storage Area 4 (SWSA 4) include employing a state-of-the-art trenching technology that ensures that the project meets the regulatory requirements for reducing groundwater infiltration into the waste burial grounds. Using a one-of-a-kind single-pass trencher, workers are able to install 2,450 feet of continuous pipe and drainage stone at one time. This saves time and has the added safety benefit of eliminating any open trenches. Using laser leveling technology, the trencher automatically adjusts its position to install the 8-inch drainage pipe at the precise depth and slope to divert groundwater around the waste burial ground.

How We Serve the Public

The Department is addressing the legacy of more than 50 years of nuclear weapons production and nuclear power research and development. The scope of the environmental program includes stabilization and disposition of some of the most hazardous materials known to man. The cleanup program resulting from over five decades of nuclear weapons

production and energy research is the largest active cleanup program in the world, encompassing over two million acres at 114 sites. As of September 2004, the cleanup of 76 sites has been completed. An additional 32 sites will be remediated by 2025, leaving six sites to be addressed after 2025.



Savannah River Site: Members of the Citizens Advisory Board are briefed by Savannah River Site personnel at the old radioactive waste burial ground.

Program Goal and Annual Targets Supporting Environmental Management

Integral to meeting the General Goal, the Department is targeting 89 and 100 geographic sites to be completed by the end of FY 2006 and FY 2012, respectively (EM GG 6.18). To ensure a successful glide path to these future interim targets, in FY 2003 EM established a new set of corporate per-

formance measures that enables the program to track the accomplishment of risk-reducing actions at each of its sites. EM's corporate performance measures are quantitative and provide a comprehensive programmatic perspective to completing the EM mission. The performance measures, each of which has an established annual target, are tracked in the context of the total measure (life-cycle) necessary to complete each site as well as the EM program as a whole. The five key performance measures discussed in the following paragraphs portray the broad scope of challenges the program faces in completing its cleanup mission.

The continued packaging of plutonium metal or oxide for long-term storage and the packaging of bulk plutonium or uranium residue for disposition are crucial milestones in the on-going clean-up efforts. As shown in Chart 1, EM has been making significant progress in the packaging of plutonium metal or oxide containers for long-term storage, and has consistently completed more actual work than planned over the past three years. Chart 2 depicts the progress EM has made in packaging bulk plutonium or uranium residues. In FY 2002 and FY 2003, EM's actual completion was above the planned targets resulting in EM completing the planned FY 2004 target quantity earlier than expected. In FY 2004, all remaining plutonium materials were packaged and removed from the Rocky Flats site, which dramatically reduced the site security costs as well as the safety and health risk to workers and the public. This reduction in the inventory of high risk nuclear materials by preparing it for long-term stor-

Chart 1 – Plutonium Metal or Oxide Packaged for Long-Term Storage

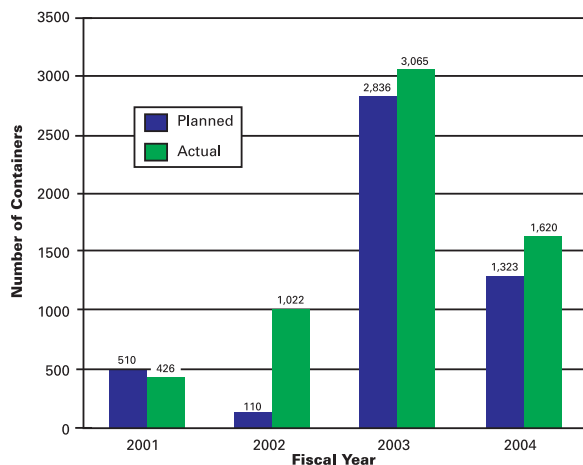
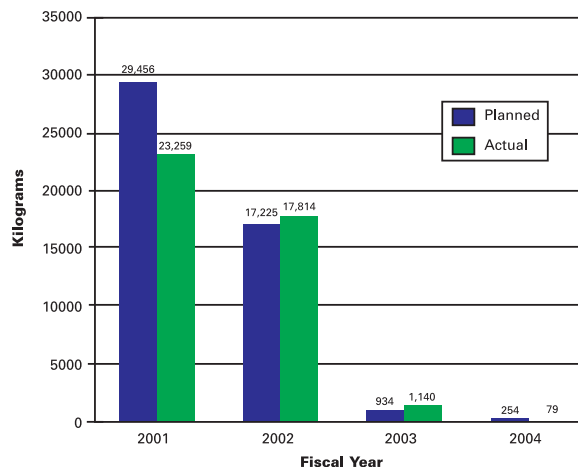


Chart 2 – Bulk Plutonium or Uranium Residues Packaged for Disposition



age or disposition quantitatively measures the Department's progress towards environmental, safety, and security risk reduction. Furthermore, the accelerated completion of activities that are major cost drivers frees up funds to accelerate environmental cleanup and risk reduction elsewhere (EM GG 6.18.1, EM GG 6.18.2).

By reducing the amount of highest risk radioactive liquid waste in inventory and subsequently closing the liquid waste tanks, the Department is demonstrating tangible evidence of EM's program goal to accelerate reduction of the highest risks in the complex. In addition to eliminating high risk material, corresponding life-cycle cost reductions are achieved for an activity that is a major cost driver to the EM program. Chart 3 shows that starting in FY 2003 and continuing through FY 2004, efforts to close tanks were delayed as a result of the legal uncertainty of the Department's WIR authority. No work was planned in FY 2001 - FY 2002. The FY 2005 National Defense Authorization Act provides a statutory mechanism which allows DOE to resume tank closure at the Savannah River Site and the Idaho National Laboratory (EM GG 6.18.3)

The Department is preparing DOE SNF for final disposition in order to ensure the material is ready for disposal in the federal geologic repository (EM GG 6.18.4). As Chart 4 summarizes, EM has had target shortfalls the previous two fiscal years due to technical problems encountered at the Hanford site. However, in FY 2004, these problems were resolved, allowing EM to exceed its annual target and make up for a portion of the previous years' shortfalls.



Hanford Site: Spent nuclear fuel project workers moving a Multi-Canister Overpack (MCO) of irradiated fuel From the K-West Basin. The purpose of this project was to move irradiated fuel out of undesirable wet storage near the Columbia River to safe, dry, interim storage in central Hanford. Fuel removal from the K-Basins was completed in FY 2004.

Chart 3 - Liquid Tanks Closed

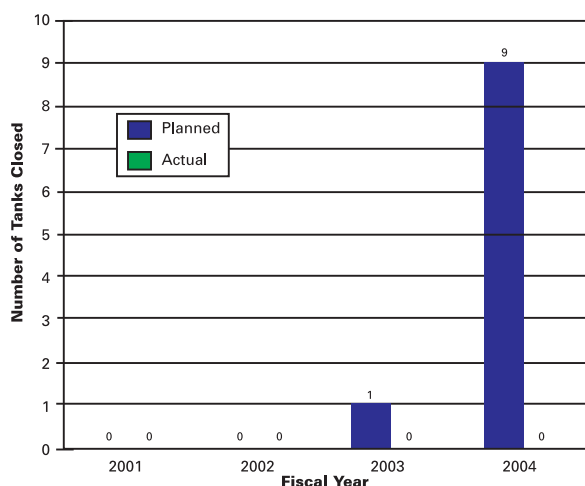
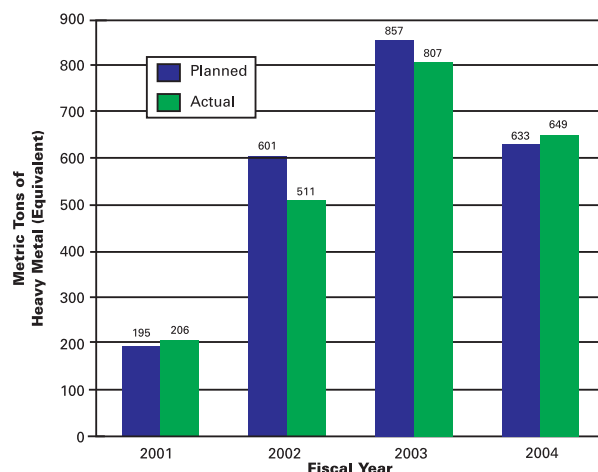


Chart 4 - Packaging of Spent Nuclear Fuel for Disposition



Completion of high risk SNF activities results in life-cycle cost reductions for the EM program.

In order to complete a geographic site (e.g., Fernald), the Department must complete remediation of discrete areas of contamination defined as release sites. EM has focused additional efforts to remediate release sites such that it has exceeded its annual target in each of FY 2002, FY 2003, and FY 2004 as depicted in Chart 5. This acceleration in the completion of release sites at Rocky Flats, Hanford, and Sandia National Laboratory, is a good indicator of a geographic site's progress towards completion. When active remediation at all release sites has been completed in accordance with the terms and conditions of cleanup agreements, a geographic site will be considered complete in its entirety. Each geographic site completion is an additional increment toward meeting the EM program goal and in turn, the EM General Goal.

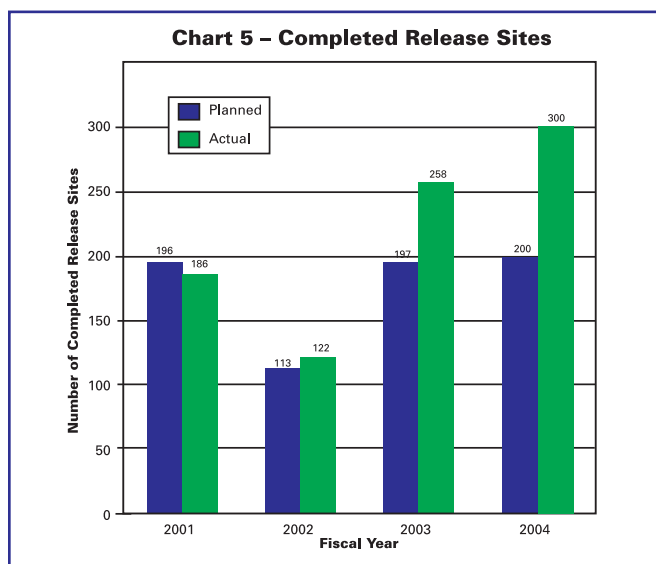


Fernald: Operating engineers raze the last section of the Pilot Plant. The facility was the last of 10 plants to be removed from the Fernald Skyline. The Pilot Plant was the first plant to go on line at Fernald. The plant served as an operating prototype for all phases of the uranium metal production process and a training area for new operators. Operations consist of surface decontamination, building and equipment dismantlement, size reduction of building material and the loading of demolition debris into rolloff boxes for transfer to the on-site disposal facility.

More detailed information concerning the performance results for the above referenced goal and targets is available in the Performance Results section.

Nuclear Waste - General Goal 7:

License and construct a permanent repository for nuclear waste at Yucca Mountain and begin acceptance of waste by 2010.

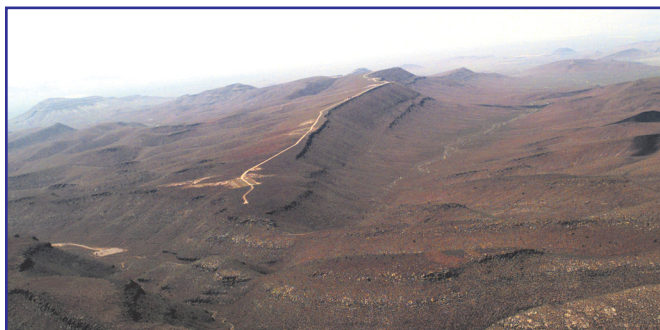


Associated with the Nation's energy supply is the Federal responsibility for the ultimate repository for SNF and HLW. This responsibility includes licensing, building, and operating a deep geologic repository at Yucca Mountain, Nevada, for the disposal of both commercial and the Department's SNF, HLW, and surplus fissile materials. Implementing this goal is the responsibility of the Office of Civilian Radioactive Waste Management (OCRWM). After more than two decades of scientific study, President Bush signed the joint Congressional Resolution designating Yucca Mountain, Nevada, as the site of the Nation's first geologic repository for HLW and SNF in July 2002.

External Factors

The Department intends to submit to the NRC a license application for the Yucca Mountain repository as soon as possible after we have resolution on the approach to address the lack of an EPA Standard. The opening date of the repository will depend on a number of factors, including: the implementation of an EPA Standard, the ability to begin early construction of site support facilities/utilities, and an adequate funding profile.

- **Regulatory Requirements:** The Nuclear Regulatory Commission (NRC) is responsible for approving a Departmental license application for Yucca Mountain. Any delay in issuing a license could subsequently delay the commencement of repository operations. The action of the Federal Court of Appeals in July 2004, vacating the 10,000-year compliance period in the EPA



Radioactive Waste Repository site, Yucca Mountain, Nevada

regulations for Yucca Mountain, introduces additional uncertainty with respect to the final regulatory requirements needed for a licensing decision. In addition, in August 2004, an NRC panel vacated the Department's initial certification of its Licensing Support Network (LSN) material that is being made available for discovery purposes. Certification of the LSN is a prerequisite for submitting a license application.

- **Litigation:** It is likely that any new EPA Standard and any NRC decision to issue a license to construct and operate a repository at Yucca Mountain will be challenged in the courts. The outcomes of a number of pending lawsuits by the state of Nevada, local jurisdictions, and others also pose schedule and financial risks to the program.
- **Congressional Funding:** In Fiscal Year 2005, and beyond, the nuclear waste disposal program will need a significant increase in funding to pay for the design, construction and operation of the repository and for the transportation infrastructure. Although the annual receipts and accumulated balance in the Nuclear Waste Fund are sufficient to fund current needs, budget processes have severely limited access to those funds. The Administration has submitted a legislative proposal to ensure the availability of the long-term funding required to accomplish program objectives.

How We Serve the Public

For more than half a century, the U.S. has been generating SNF and HLW by using materials to produce electricity, power naval vessels, perform research and development, and develop nuclear weapons. These materials are currently stored in temporary facilities at some 125 sites in 39 states (see

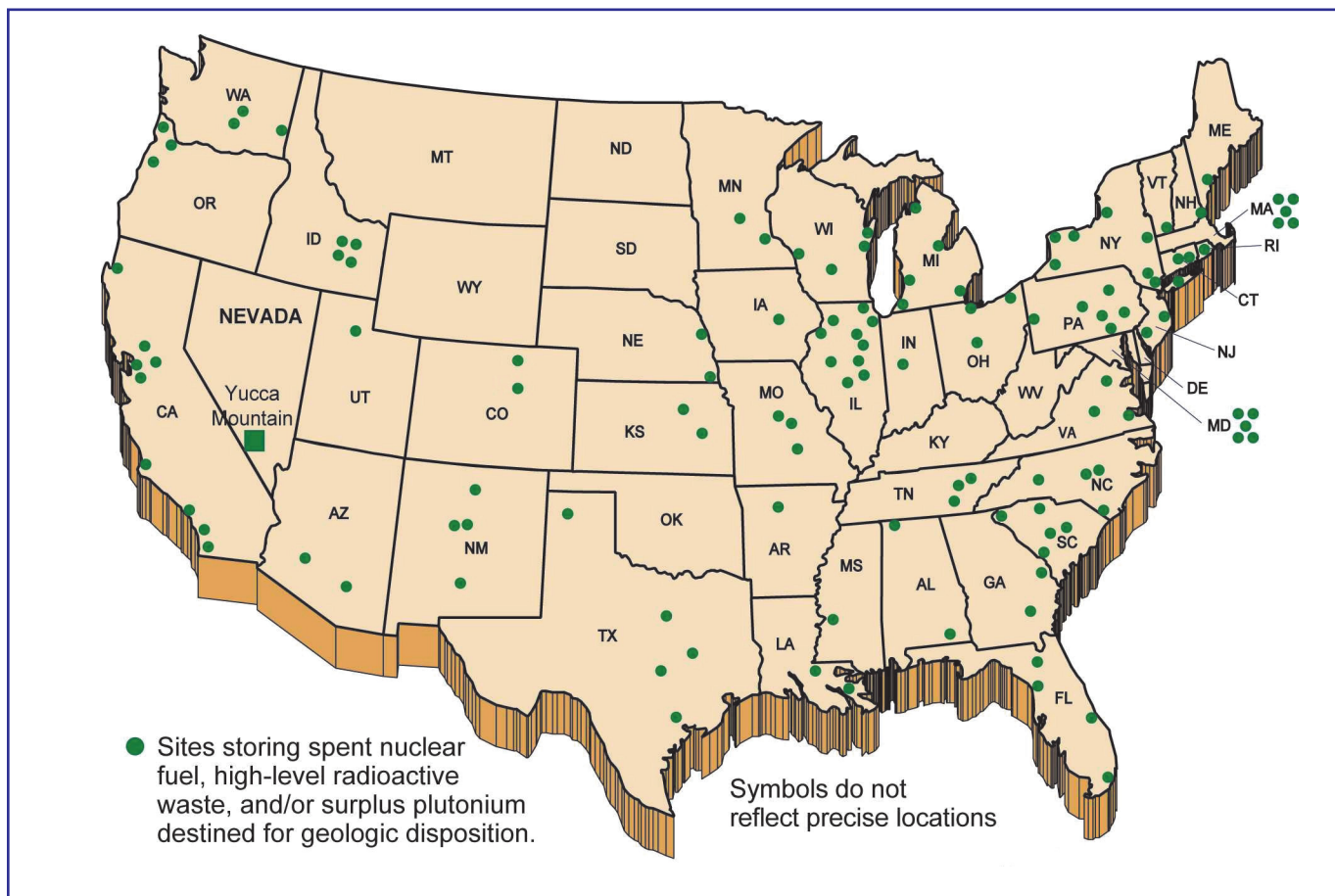
map on the following page). More than 160 million Americans live within 75 miles of one or more of these sites.

The nuclear waste disposal program, mandated by the Nuclear Waste Policy Act of 1982, as amended, is a key priority for the Administration. The ultimate consolidation and disposal of nuclear waste at Yucca Mountain will support national security and energy security, reducing the number of locations where nuclear materials are stored and maintaining the viability of the Navy's nuclear powered fleet. Nuclear waste disposal is also essential for maintaining the viability of the commercial nuclear power industry, which currently supplies more than 20 percent of the nation's electricity. Congress has indicated that continued support for nuclear power development is contingent upon successfully establishing the repository.

Program Goal and Target Supporting Nuclear Waste

There is only one program goal associated with Nuclear Waste General Goal: In 2010, the Yucca Mountain repository is licensed, constructed, and operating; the national and Nevada waste transportation systems are in place; activities required to support receipt and emplacement of SNF and HLW at the repository are proceeding on schedule (RW GG 7.25). OCRWM's program goal directly supports the General Goal by establishing the framework for initial waste receipt, as well as the infrastructure to support ongoing repository operations.

Several significant accomplishments were made in support of the OCRWM program goal. Progress was made on completing a high quality defensible license application (including the underlying scientific, technical and design work) that meets regulatory requirements, merits the Commission's confidence, and provides the basis for beginning repository operations. (RW GG 7.25.1) In FY 2004, steps were taken to establish and certify a computer based documentation system, known as the Licensing Support Network. The system will contain all documentation associated with the regulatory review of the Department's license application and will be used by the various stakeholders during the discovery and evaluation process. In August 2004, an NRC panel vacated the Department's initial certification of its LSN. Assuring a successful review by the NRC



and gaining approval to begin construction are prerequisites to achieving the Department's goals.

A transportation strategic plan was issued early in FY 2004 which provides the strategic framework for the development of the national and Nevada transportation infrastructure. In addition, during FY 2004, significant policy decisions were made relative to using rail primarily as a safe and cost effective method of transporting waste to Yucca Mountain and the selection of a rail route. Following years of careful study, the Caliente Corridor was selected as the route for constructing a rail line within Nevada to the repository. These activities have been crucial for establishing the detailed approach, timetable, costs and capabilities for transporting the nuclear waste from throughout the country to the repository.

More detailed information concerning the performance results for the above referenced goal and target is available in the Performance Results section.

Challenges and Future Expectations

High-Level Waste: In FY 2003, the U.S. District Court for the District of Idaho ruled against the

Department with respect to the Department's authority to classify tank waste as "incidental waste" in accordance with the Department's policy on Waste Management, ruling that it violated the Nuclear Waste Policy Act. The Department appealed the 2003 Idaho District Court decision. On November 5, 2004, the 9th Circuit Court of Appeals overturned the District Court's decision and directed the Court to dismiss the lawsuit. In addition, the FY 2005 National Defense Authorization Act provides a statutory mechanism which allows DOE to resume tank waste cleanup at the Savannah River Site and the Idaho National Laboratory.

Top-to-Bottom Review Initiatives: A Top-to-Bottom review of the EM program was completed in February 2002. Since the release of the resultant report, reforms within the program have enabled EM to reduce its cleanup liability by nearly \$50 billion. They have also contributed to a shortening of cleanup completion by 35 years, from 2070 to 2035. EM will continue the process of implementing the following initiatives in order to realize the goal of achieving tangible results in accelerating risk reduction and cleanup:

- **Human Capital Revitalization:** The standup of the Consolidated Business Center in FY 2005 will increase program efficiency by consolidating business functional services for select closure sites (Reference Discussion of Consolidated Business Center).
- **Acquisition Strategy:** The Department will continue to recompet and renegotiate contracts to shorten schedules, establish more focused performance incentives, and restructure projects to accelerate risk reduction.
- **Configuration Control:** Through a Configuration Control Board, the Department will ensure that site end states, performance measures and performance objectives/incentives reflect those expectations and outcomes that are critical to the successful accomplishment of the environmental mission.
- **Site Baselines:** This effort represents a significant step to improve performance and accountability. Baselines are critical in enabling senior management to accurately monitor and meas-

ure the cleanup progress of each site against its completion objectives.

Nuclear Waste Disposal: Pending litigation with the commercial utilities places significant uncertainty on the Government's financial liabilities. Based on the controversial nature of nuclear waste transportation and disposal, there are many institutional barriers and constituencies that oppose the project. It is expected that additional litigation will be used as an obstacle as the project proceeds. There is also a large degree of uncertainty associated with the NRC's review of the repository's license application. In FY 2004, the Department retained an experienced law firm to serve as regulatory counsel during the licensing process.

In FY 2005 and beyond, significantly increased funding will be required to support repository design, construction and operation. Similarly, completion of the transportation infrastructure will require construction of a 300+ mile rail line, acquisition of specialized rail cars, a large variety of truck and rail shipping containers (known as casks), and maintenance facilities to support an estimated 175 shipments per year over a 24 year period. While this program is a priority of the Administration, it will still be a challenge to secure funding from Congress in a climate of competing national priorities. The Department has proposed an alternative funding strategy and implemented a phased approach to construction and operations to help mitigate the annual funding challenge.

The existing legal and regulatory basis for the repository limits the amount of SNF that can be disposed of at Yucca Mountain to 70,000 metric tons until a second repository is operational. Based on current inventories and future projections this volume is likely to be exceeded. The Nuclear Waste Policy Act requires that the need for a second repository be determined by January 2010. Over the next several years, the Department will investigate advanced technology options that could potentially and significantly reduce the amount or toxicity of nuclear waste. For example, the Department's Advanced Fuel Cycle Initiative program will provide a means to develop new technologies, which if successful, could reduce the volume of HLW from SNF fuel, thus reducing the long-term geologic disposal capacity needed.

EM's Consolidated Business Center

In FY 2004, the Department announced the selection of the greater Cincinnati area as the site for the Department's national Consolidated Business Center (CBC) for its EM program. The CBC will combine essential business and technical support services in one location and serve as a central clearinghouse for a wide range of activities, from financial management and contracting to human resources and information resource management, supporting DOE's national environmental cleanup mission.

The CBC will combine essential business and technical support services in one location to serve DOE's environmental management efforts all over the country. This will allow the Department to do its job better, more efficiently, and with greater savings for the taxpayer.

Ultimately, the CBC will be staffed with a cadre of skilled employees who possess expertise in managing site closure requirements. This cadre will leverage and support the closure of other DOE sites in accordance with EM accelerated site performance plans. The CBC is needed to assure uninterrupted business services for the closure sites as they downsize and lose existing experienced staff. The initial staffing plan consists of consolidating critical business functions needed for site closures. These functions include financial management, procurement, human resource management, information management, legal services, certain logistics functions, and the closure cadres.

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